WHAT IS CLAIMED IS

1. A process for continuous production of cumene hydroperoxide comprising liquid phase oxidation of cumene in a reactor in the presence of an oxygen-containing gas under such conditions that an oxygen content of the total oxygen-containing gas volume fed into the liquid phase in the reactor is adjusted to not less than 22 mol% and not more than 50 mol%, and the cumene hydroperoxide production per unit volume of the reaction fluid in the reactor is not less than 22 $kg/m^3/hr$.

2. A process according to claim 1, wherein the gas fed into the liquid phase in the reactor is a mixture of two or more gases.

3. A process according to claim 1 or 2, wherein the gas fed into the liquid phase in the reactor is an oxygen enriched air which is a mixture of air with oxygen.

4. A process according to any one of claims 1 to 3, wherein an oxygen content of a spent gas of the reactor is not less than 2 mol% and not more than 10 mol%.

5. A process according to any of claims 1 to 4, wherein the oxygen-containing gas is fed into the reactor using a

sparger whose aperture pitch is at least twice the aperture diameter.

6. A process for continuous production of cumene hydroperoxide comprising liquid phase oxidation of cumene in a reactor in the presence of an oxygen-containing gas under such conditions that an oxygen content of the total oxygen-containing gas volume fed into the liquid phase in the reactor is adjusted to not less than 22 mol% and not more than 50 mol%, and an oxygen content of a spent gas of the reactor is not less than 2 mol% and not more than 10 mol%.

7. A process according to claim 6, wherein the gas fed into the liquid phase in the reactor is a mixture of two or more gases.

8. A process according to claim 6 or 7, wherein the gas fed into the liquid phase in the reactor is an oxygen enriched air which is a mixture of air with oxygen.

9. A process according to any one of claims 6 to 8, wherein the oxygen-containing gas is fed into the reactor using a sparger whose aperture pitch is at least twice the aperture diameter.

10. A process for continuous production of cumene hydroperoxide comprising liquid phase oxidation in a reactor in the presence of an oxygen-containing gas under such conditions that an oxygen content of the total oxygen-containing gas volume fed into the liquid phase in the reactor is adjusted to not less than 22 mol% and not more than 50 mol%, and said oxygen-containing gas is fed into the reactor using a sparger whose aperture pitch is at least twice the aperture diameter.

11. A process according to claim 10, wherein the gas fed into the liquid phase in the reactor is a mixture of two or more gases.

12. A process according to claim 10 or 11, wherein the gas fed into the liquid phase in the reactor is an oxygen enriched air which is a mixture of air with oxygen.

13. A process for production of phenol comprising acid decomposition of cumene hydroperoxide obtained any one of claims 1, 6 or 10.